

## **DETAILED ACTION**

### ***Status of Application***

1. The claims 69-90 are pending and presented for the examination.

### ***Priority***

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/IB04/02049. However, the foreign application does not show support for all limitations of the claims. Specifically, the application does not teach that calcium sulfate is used as the cementitious material in the wet mixture. Because all of the limitations of the claims are not supported by the foreign application, priority has not been given for the foreign filing date. Instead, priority is given for the PCT filing date, 06/21/2004.

### ***Information Disclosure Statement (IDS)***

3. The information disclosure statement (IDS) was submitted on 04/13/2006. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Please refer to applicant's copy of the 1449 herewith.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 69-71, 74-78, 81-83, and 86-88 are rejected under 35 U.S.C. 102(b) as being anticipated by Sengupta et al (US 2003/0092848).

**Claim 69** is drawn to a method of forming a liner comprising mixing a water-based dispersion of polyurethane, a water-based dispersion of acrylic, and a cementitious material and applying said mixture to a surface.

Sengupta et al teaches a method of mixing and then applying to a surface a liner comprising a water-based dispersion of polyurethane, a hydrophilic prepolymer and an optional filler that can comprise calcium sulfate. A suitable polyurethane dispersion is a urethane/acrylic based polyurethane (see paragraph 0027). This is equivalent to using a water-based dispersion of a polyurethane and a water-based dispersion of an acrylic. Additionally, Sengupta et al teaches that a water-based dispersion of acrylic may replace part of the polyurethane dispersion (see paragraph 0029). These teachings clearly suggest liner compositions wherein the amounts of polyurethane dispersion and acrylic dispersion would each fall within the broad ranges claimed by applicant. Additionally, Sengupta et al teaches that a filler material such as calcium sulfate (a cementitious material) can be added to the liner composition to achieve such desirable effects as shrinkage resistance, incompressibility, and fire resistance (see paragraphs 0046 and 0047). Sengupta et al teaches that the filler material is added in amounts of 5-20 parts per hundred (see paragraph 0046). This teaching, taken with the teachings on the amount of polyurethane dispersion present in the liner (see claim 22), clearly teach

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compositions comprising a polyurethane dispersion and an acrylic dispersion each in an amount between 5 and 75 wt%, as well as a cementitious material comprising the remaining amount. Therefore, the limitations of claim 1 are anticipated by Sengupta et al.

**Claim 70** further limits claim 69 by stating that the cementitious material includes anhydrous calcium sulfate.

**Claim 71** further limits claim 70 by provide a range for the amount of anhydrous calcium sulfate present.

As discussed above, calcium sulfate can be present in the composition taught by Sengupta et al in the amount of 5-20 parts by weight. This clearly anticipates that amounts of claim 71. Although it is not explicitly taught that the calcium sulfate is anhydrous, this fact is implicitly taught by the inclusion of gypsum in the list of possible fillers. Gypsum is hydrated calcium sulfate. The teaching of this filler along with calcium sulfate implies that the teaching of calcium sulfate without any hydration mentioned is, in fact, the teaching of anhydrous calcium sulfate. Therefore, the limitations of claims 70 and 71 are anticipated by Sengupta et al.

**Claim 74** further limits claim 69 by listing means by which the liner is applied.

Sengupta et al teaches that the liner can by applied by spraying (see paragraph 0049 and title).

**Claim 75** further limits claim 74 by stating that the surface is coated to a thickness of between 0.1 and 5 mm.

Sengupta et al teaches that the mixture can be coated onto the wall of a mine at a thickness of between 0.5-6 mm (see paragraph 0024).

**Claims 76-78** are drawn to a kit for producing a liner with the composition of claims 69-71. **Claims 81-83** are drawn to a wet mixture for forming a liner with the composition of claims 69-71. **Claims 86-88** are drawn to a liner with the composition of claims 69-71.

These claims are drawn to different, but equivalent embodiments of the composition used in the method of claims 69-71. Because Sengupta et al anticipates the composition of claims 69-71, claims 76-78, 81-83, and 86-88 are necessarily also anticipated by Sengupta et al.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
8. Claims 72-73, 79-80, 84-85, and 89-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sengupta et al (US 2003/0092848) in view of Chen (US 5306764).

**Claim 72** further limits claim 69 by stating that the mixture further comprises an epoxy resin and epoxy hardener.

**Claim 73** further limits claim 72 by giving amounts for the epoxy hardener and epoxy resin.

As discussed above, Sengupta et al anticipates the mixture composition of claim 69. Sengupta fails to teach that an epoxy resin and hardener are added to the mixture. However, the use of epoxy resin and epoxy hardeners in polyurethane coating materials was known in the art as a method for increasing the binding strength of the mixture. Therefore, it would have been obvious to one of ordinary skill in the art at the time that the invention was filed to add an epoxy resin and hardener to the composition taught by Sengupta et al. One would expect this to have the desired effect of increasing the binding strength in the composition.

Chen teaches a polyurethane-based coating composition that contains epoxy resin (see Abstract and column 5, lines 2-11). The composition also contains polyamines that are equivalent to the epoxy hardener of instant application (see column 2, lines 60-65). Chen teaches in example 3 a composition wherein the epoxy resin and

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polyamine components are each present in the composition in amounts between 1 and 10% (see column 7, lines 38-67).

One would have been motivated to modify Sengupta et al in view of Chen because Chen teaches that the addition of epoxy resins to the coating composition improves the strength and viscosity by crosslinking the polymer composition. Because these are desirable traits for a composition such as that taught by Sengupta et al, one would have been encouraged to add epoxy resin and polyamine components to the Sengupta composition. According to the teachings of Chen, these components would be added in amounts that fall within the ranges of claim 73. One would have expected reasonable success in such a modification because both Sengupta et al and Chen are drawn to water-based polyurethane-type coating, and thus adding a component from one coating into the composition of another would not be expected to produce any detrimental results. Therefore, claims 72 and 73 are obvious and not patentably distinct over the prior art of record.

**Claims 79-80, 84-85, and 89-90** are dependent claims of claims 76, 81, and 86. As discussed above, these independent claims are drawn to different incarnations of the mixture used in the process of claim 69. The dependent claims simply add the epoxy resin and epoxy hardener limitations to each of these independent claims. Because all of the independent claims are anticipated by Sengupta et al, the rejection through the modification of Sengupta et al in view of Chen also applies these identical dependent claims 79-80, 84-85, and 89-90. Therefore, the dependent claims are obvious and not patentably distinct over the prior art of record.

***Conclusion***

9. No claim is allowed.
10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Noah S. Wiese whose telephone number is 571-270-3596. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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November 16<sup>th</sup>, 2007

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/Vickie Kim/

Supervisory Patent Examiner, Art Unit 4116